

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Bernd Sachweh et al.

Application No.: 10/551.858

Confirmation No.: 6808

Filed: October 3, 2005

Art Unit: 1762

For: IN SITU RECOATING OF CATALYST BEDS

Examiner: W. P. Fletcher

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed in this case on February 27, 2010, and is in furtherance of said Notice of Appeal.

The fees required under § 41.20(b)(2) are dealt with in the accompanying
TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.2:

I.	Real Party In Interest
II.	Related Appeals and Interferences
III.	Status of Claims
IV.	Status of Amendments
V.	Summary of Claimed Subject Matter
VI.	Grounds of Rejection to be Reviewed on Appeal
VII.	Argument
VIII.	Claims
Appendix A	Claims
Appendix B	Evidence

Appendix C Related Proceedings

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

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II. RELATED APPEALS AND INTERFERENCES

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 21 claims pending in application.

B. Current Status of Claims

1. Claims canceled: 1-13, 26, 34, and 35
2. Claims withdrawn from consideration but not canceled: None
3. Claims pending: 14-25, 27-33, 36 and 37
4. Claims allowed: None
5. Claims rejected: 14-25, 27-33, 36 and 37

C. Claims On Appeal

The claims on appeal are claims 14-25, 27-33, 36 and 37.

IV. STATUS OF AMENDMENTS

Appellant did not file an Amendment After Final Rejection. A Preliminary Amendment was filed on April 13, 2005. The claims appealed herein are the claims of record and considered in the Amendment filed on July 13, 2009, in reply to the Non-Final Office Action March 16, 2009, the Amendment filed on February 16, 2009, in reply to the Final Office Action of

November 19, 2008, and the Amendment filed on July 7, 2008, in reply to the Non-Final Office Action of April 4, 2008.

V. SUMMARY OF CLAIMED SUBJECT MATTER

This section includes a concise explanation of the subject matter defined in each of the independent claims involved in the appeal (i.e., claims 14 and 37), which includes references to the specification, as specified in 37 C.F.R. § 41.37.

The claimed subject matter relates to a process for coating internals in a reactor except for the coating of electrically heatable, at least partly open-cell foams, with a catalytically active solid material or a precursor thereof. In the process, as described in independent claim 14, an aerosol which contains the catalytically active material or the precursor thereof as a disperse phase is provided and the aerosol is passed through the reactor at a rate in the range from 0.1 to 4 m/s, which is established so that the disperse phase of the aerosol is deposited on the internals in the reactor and in which the reactor is employed for carrying out oxidation or hydrogenation reactions and the oxidation or dehydrogenation reactions are synthesis of maleic anhydride, phthalic anhydride, acrolein, (meth)acrylic acid or ethylene oxide. Independent claim 14 is discussed at page 1, line 31 to page 2, line 17, and page 3, lines 1 to 20 of the specification.

The claimed subject matter also relates to a process for coating internals in a reactor, except for the coating of electrically heatable, at least partly open-cell foams, with a catalytically active material or a precursor thereof. In the process, as described in independent claim 37, an aerosol which contains the catalytically active material or the precursor thereof as a disperse phase is provided and the aerosol is passed through the reactor at a rate in the range from 0.1 to 4 m/s, which is established so that the disperse phase of the aerosol is deposited on the internals in the reactor and in which the reactor is employed for carrying out oxidation or hydrogenation reactions and the oxidation or dehydrogenation reactions are synthesis of maleic anhydride, phthalic anhydride, or ethylene oxide. Independent claim 37 is discussed at page 1, line 31 to page 2, line 17, and page 3, lines 1 to 20 of the specification.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Has the Examiner shown that claims 14-19, 23-25, 27-31, 33, and 36 are obvious under 35 U.S.C. 103(a) over WO99/41011 A1 to Unverricht et al. ("Unverricht")?

B. Has the Examiner shown that claims 20-22 and 30-32 are obvious under 35 U.S.C. 103(a) over Unverricht and further in view of WO 02/12158 A1 to Franz et al. (US Patent No. 7,038,065 is the English language equivalent relied on by the Office) ("Franz")?

C. Has the Examiner shown that claim 37 is obvious under 35 U.S.C. 103(a) over Unverricht and further in view of Franz?

VII. ARGUMENTS

A. Unverricht Does Not Describe or Suggest All of the Features and Components of the Claimed Coating Process

Claims 14-19, 23-25, 27-31, 33, and 36 are rejected as obvious under 35 U.S.C. 103(a) over Unverricht.

The differences between the cited reference and the coating process of independent claim 14 are very apparent. First, Appellants assert that it is an object of the process to coat materials, which have already been introduced into reactors for carrying out heterogeneously catalyzed reactions, with a catalytically active material or with precursors for the formation of catalytically active material, i.e., to permit in situ coating of internals in a reactor for carrying out heterogeneously catalyzed reactions. In this way, it is possible to regenerate the entire catalyst bed of the activated catalyst, without it being necessary to remove the catalyst for this purpose and hence without significant losses of time on stream for the reactor. In particular, as described in the present specification, "[the] effort for refilling catalyst tubes is avoided by reactivating deactivated catalyst material in situ." Specification at page 4, line 35 to page 5, line 6. (Emphasis added).

Second, as recited in the claimed coating process, internals are coated "in a reactor except for the coating of electrically heatable, at least partly open-cell foams, with a catalytically active solid material or a precursor thereof." Appellant's independent claim 14. (Emphasis added). As described in the present specification, "it is possible to coat internals in a reactor for carrying out heterogeneously catalyzed reactions without time-consuming and expensive removal thereof in

the reactor itself with catalytically active material or a precursor for the preparation of catalytically active material.” Specification at page 2, lines 1-4. The specification further describes that

it is first necessary to provide an aerosol which contains the catalytically active material or a precursor thereof as the disperse phase. Aerosols are defined in general as colloidal systems of gases with small solid or liquid particles having a particle size of up to 10 μm distributed therein. The catalytically active material appropriate to the respective reaction is chosen as the disperse phase for the aerosol, which material is present as a rule in the form of a solid.

Id. at lines 6-11. (Emphasis added).

By contrast, Unverricht does not describe or indicate at all the in situ objective of regenerating the entire catalyst bed of the activated catalyst, without the necessity of removing the catalyst for this purpose, or a catalytically active material as a solid. Indeed, when Unverricht is considered in its entirety, there is no mechanism or guidance for such provisions. See *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984) (indicating that prior art references must be considered in their entirety, as a whole, including any disclosures that lead away from the claims at issue).

For instance, regarding the catalyst, Unverricht merely describes the material as a liquid or dispersion, as follows:

The first made preparation of a liquid starting mixture in form of a solution, an emulsion and/or a dispersion corresponding in the DE-A 198 05 719 described manner. The liquid mixtures contain generally a liquid chemical component, those as solvent, emulsifying aid or dispersion aid for the other components of the mixture used becomes.

Unverricht at page 2, English (machine) translation. (Emphasis added). Therefore, Unverricht teaches away from the process of Appellant's independent claim 14 (i.e., using a solid and not liquid).

The Office has asserted that “[w]hile the material applied in the cited prior art is a liquid aerosol, it is the Examiner's position that the final, useful form is a solid. As such it reads on a precursor of a catalytically active solid material.” Final Office Action mailed November 27, 2009, pages 4 to 7, paragraph 6, pages 3 to 4. (Emphasis in original).

However, Appellants point out that other than the Office's conclusory statement, there is no showing or guidance in the reference's disclosure for the form of the catalytically active solid material as presently claimed. *See KSR*, 127 S. Ct. at 1741 (citing *In re Kahn*, 441 F.3d 977, 988 (C.A.Fed. 2006) (emphasizing that "rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness"). (Emphasis added). Moreover, the Office has not shown that there would be an apparent reason to modify Unverricht for any such specific inclusions.

Further, Unverricht does not expressly mention, indicate, or show any specific requirement of an "aerosol" as presently claimed. In fact, as admitted by the Office, Unverricht "does not expressly teach the claimed means of manufacturing the aerosol." Final Office Action mailed November 27, 2009, page 5, paragraph 6. C. ii.

Therefore, the process of Appellant's independent claim 14 is not *prima facie* obvious over Unverricht, or the combination of Unverricht and Franz, discussed *infra*.

Appellant further points out that an obviousness analysis under 35 U.S.C. § 103 requires, *inter alia*, consideration of the differences between prior art references and the claims at issue. *See KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007) ("*KSR*") (citing *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18, 86 S. Ct. 684 (1966) ("*Graham*") (describing factors that control an obviousness inquiry). In *Graham*, the U.S. Supreme Court ("Court") set forth the framework for applying the statutory language of 35 U.S.C. § 103, and in *KSR* the Court determined that the *Graham* factors were still useful and provided "helpful insight" to an obviousness inquiry. *KSR*, 127 S. Ct. at 1741.

However, in making its obviousness determination, the Court indicated the importance of identifying a "reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *Takeda Chem. Indus., v. Alphapharm Pty. Ltd.*, 492 F.3d 1350, 1356-57 (Fed. Cir. 2007) ("*Takeda*") (quoting *KSR*, 127 S. Ct. at 1731). In the chemical case *Takeda*, the U.S. Court of Appeals for the Federal Circuit concurred with the Court's reasoning by also emphasizing that "it remains necessary to identify some reason that would have led a chemist" to make the modification in order to establish *prima facie* obviousness. 492 F.3d at 1350.

Consistent with the above legal precedents, the Board of Patent Appeals and Interferences (“Board”) recently found in *Ex parte Martin Haubner and Rolf Pinkos*, Appeal No. 2009-0449 that chemical process claims were not obvious over a cited combination of references. In the decision, the Board explained that “in rejecting claims under 35 U.S.C. § 103, the examiner bears the initial burden of presenting a case of *prima facie* obviousness,” in which the Board determined that the Office erred in its initial determination of obviousness and assessment of the technical differences between the claimed process and the disclosures of the references.

In the present case, as discussed *supra*, the Office has not demonstrated that Unverricht describes or suggests the claimed processes for coating internals in a reactor, in light of the differences between the cited reference and the claimed specific combination of components; or articulated a reason that one skilled in the art would have been led to modify or combine Unverricht with any other reference to achieve such a process. Accordingly, reversal of the rejection is respectfully requested.

B. Franz Does Not Cure All of the Technical Deficiencies of the Process of Unverricht

Claims 20-22 and 30-32 are rejected as obvious under 35 U.S.C. 103(a) over Unverricht and further in view of Franz et al.

The disclosure of Unverricht is technically deficient for several reasons, including the non-disclosure of the features of Appellant’s dependent claims, as admitted by the Office. *See* Final Office Action mailed November 27, 2009, pages 4 to 7, in which the Office admits that Unverricht “does not expressly teach” the components or features of any of the claims dependent from Appellant’s independent claim 14 (i.e., claims 15 to 36).

Moreover, Appellant points out, as discussed *supra*, that Unverricht is at least deficient for the reason that Unverricht does not describe or indicate at all reactivating deactivated catalyst material in situ or a catalytically active material as a solid.

Regarding Franz, the reference only generally describes a method for catalytically producing organic substances by partial oxidation. According to Franz, the disclosed method is merely achieved by at least one reactor constituting a cooling-tube reactor with cooling tubes

through which flows a cooling fluid, in which in the cooling-tube reactor 40 to 100 wt-% of the total amount of the catalyst is disposed as coating on the outside of the cooling tubes, and the feed mixture containing the feedstock and the molecular oxygen gets in contact with the catalyst layers. *See* Franz at column 2, lines 54 to 61. As such, there is no showing or any indicated reason for incorporating Franz to achieve the coating process of Appellant's independent claim 14, since the provisions of the independent claim are clearly not present.

Therefore, for at least these reasons, independent claim 14 and those dependent thereon are not obvious over the combination of Unverricht and Franz. Accordingly, reversal of the rejection is respectfully requested.

C. One Skilled in the Art Would Not Have Been Led to Achieve Appellant's Claimed Process

Claim 37 is rejected as obvious under 35 U.S.C. 103(a) over Unverricht and further in view of Franz.

The Office has not shown that one skilled in the art would even consider modifying Unverricht with Franz to achieve the process of Appellant's independent claim 37, much less having been led to do so. In particular, as described in claim 37, *supra*, the reactor is employed for carrying out oxidation or hydrogenation reactions and the oxidation or dehydrogenation reactions are synthesis of maleic anhydride, phthalic anhydride, or ethylene oxide.

As admitted by the Office, Unverricht "does not expressly recite that *the reactor is employed for carrying out . . . synthesis of maleic anhydride, phthalic anhydride, or ethylene oxide*." Final Office Action mailed November 27, 2009, page 7, paragraph D. (Emphasis in original). As also admitted by Office the at page 3 of the Non-Final Action at paragraph 7, Unverricht only discloses oxidation preparation of (meth)acrolein and/or (meth)acrylic acid, which clearly does not meet the technical description of the components Appellant's independent claim 37. As such, one would not rely on Unverricht as a primary basis for achieving the claimed process.

Regarding Franz, the Office has asserted that "it would have been obvious to utilize the process of [Franz] to coat catalyst on the internals of the reactor of [Unverricht] or, in the alternative, it would have been obvious to one skilled in the art to utilize, as the reactor of in [Franz], the reactor of [Unverricht]." Final Office Action mailed November 27, 2009, pages 7 to

8, paragraph D. According to the Office, “[o]ne skilled in the art would have been motivated to do so by the desire and expectation of providing catalytically coated internal surfaces for the reactor in order to successfully carry out production of the desired compound.” *Id.* (Emphasis added).

However, Appellant points out that such motivation, desire, and expectation is clearly not supported the disclosures of Unverricht and Franz. For instance, the considerations of the type of catalyst and coating layer measurements, *inter alia*, clearly differ. Specifically, in Unverricht the coating layer thickness of the catalyst for the tubing inner wall of the metallic reaction is tube is 10 to 1000 pm, which is preferred for immediate application and desired results. *See* page 2 of the machine translation. On the other hand, in Franz, the thickness is 0.05 to 5 mm, since coating the cooling tubes with such a “catalyst mass provides an improved heat transfer from the catalyst onto and through the tube wall to the cooling fluid. In the main reaction zone of the cooling-tube reactor, the high reaction temperatures unfavorable for the known process can thus be reduced considerably.” Column 3, lines 11 to 16.

Moreover, in either process described in Unverricht and Franz, there is still no indication of coating materials, which have already been introduced into reactors for carrying out heterogeneously catalyzed reactions, with a catalytically active material or with precursors for the formation of catalytically active material, i.e., permitting *in situ* coating of internals in a reactor for carrying out heterogeneously catalyzed reactions. Further, as discussed *supra*, Unverricht does not expressly mention, indicate, or show any specific requirement of an “aerosol” as presently claimed.

Therefore, in view of the different coating processes, the desire of arrangements, and level of expectations, one would not be led to achieve the claimed process or arbitrarily pluck selective teachings from Franz to modify Unverricht since there is clearly no reason or showing in either reference to do so. Further, the Office has not shown that the references, alone or in combination, describe or suggest the claimed process, or even provided any explicit analysis of why one skilled in the art would be led to modify or combine the disclosures of the references.

Accordingly, in view of the above remarks and reasons explaining the patentable distinctness of the presently appealed claims over the prior art, Appellant requests that the pending rejections under 35 U.S.C. § 103(a) be reversed.

VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A include the amendments filed by Appellant on July 13, 2009.

If any additional fees are due, please charge our Deposit Account No. 03-2775, under Order No. 13156-00026-US from which the undersigned is authorized to draw.

Dated: April 26, 2010

Respectfully submitted,

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APPENDIX A

Claims Involved in the Appeal of Application Serial No. 10/551,858

Claims 1-13 (Cancelled).

14. (Previously presented) A process for coating internals in a reactor except for the coating of electrically heatable, at least partly open-cell foams, with a catalytically active solid material or a precursor thereof, in which an aerosol which contains the catalytically active material or the precursor thereof as a disperse phase is provided and the aerosol is passed through the reactor at a rate in the range from 0.1 to 4 m/s, which is established so that the disperse phase of the aerosol is deposited on the internals in the reactor and wherein the reactor is employed for carrying out oxidation or hydrogenation reactions and the oxidation or dehydrogenation reactions are synthesis of maleic anhydride, phthalic anhydride, acrolein, (meth)acrylic acid or ethylene oxide.

15. (Previously presented) A process as claimed in claim 14, wherein the aerosol is passed through the reactor at a velocity in the range from 0.2 to 4 m/s.

16. (Previously presented) A process as claimed in claim 14, wherein the disperse phase of the aerosol has a particle size of from 0.1 to 10 μm .

17. (Previously presented) A process as claimed in claim 14, wherein the aerosol is produced by dry comminution of a solid catalyst or of a precursor of a solid catalyst, to a particle size of from 0.1 to 10 μm metering and dispersing in an inert gas stream.

18. (Previously Presented) A process as claimed in claim 14, wherein the aerosol is produced by comminuting, by means of nozzles, a liquid which may have been heated or a liquid mixture, or a solution, suspension or emulsion which may have been superheated.

19. (Previously presented) A process as claimed in claim 14, wherein the internals are formed from moldings which are movable relative to one another and are present in the form of a fixed bed, fluidized bed or moving bed.

20. (Previously presented) A process as claimed in claim 14, wherein the internals are present in the form of a consolidated, porous system.

21. (Previously presented) A process as claimed in of claim 14, which comprises internals having ordered flow channels.

22. (Previously presented) A process as claimed in claim 14, wherein the internals are pipes through which a heating medium is passed.

23. (Previously presented) A process as claimed in claim 14, wherein the disperse phase deposited on the internals in the reactor is subjected to further process steps.

24. (Previously presented) A process as claimed in claim 14, wherein the coating is an initial coating.

25. (Previously presented) A process as claimed in claim 14, wherein the coating comprises a reactivation of catalyst material on the surface of internals in a reactor.

26. (Cancelled).

27. (Previously presented) A process as claimed in claim 15, wherein the aerosol is passed through the reactor and the velocity in the range from 0.2 to 2 m/s.

28. (Previously presented) A process as claimed in claim 16, wherein the disperse phase of the aerosol has a particle size of from 0.5 to 5 μm .

29. (Previously presented) A process as claimed in claim 17, wherein the solid catalyst has a particle size of from 0.2 to 5 μm and the inert gas stream is a nitrogen stream.

30. (Previously presented) A process as claimed in claim 20, wherein the consolidated, porous system is woven fabric, knitted fabric, braid or foam; except for electrically heatable foams.

31. (Previously presented) A process as claimed in claim 21, wherein the internals are stacked packings or monoliths.

32. (Previously presented) A process as claimed in claim 22, wherein the pipes are ribbed pipes.

33. (Previously presented) A process as claimed in claim 23, wherein the disperse phase deposited on the internals in the reactor is further fixed, activated and/or calcined.

34. (Cancelled).

35. (Cancelled).

36. (Previously presented) A process as claimed in claim 27, wherein the disperse phase of the aerosol has a particle size of from 0.5 to 5 μm .

37. (Previously presented) A process for coating internals in a reactor, except for the coating of electrically heatable, at least partly open-cell foams, with a catalytically active material or a precursor thereof, in which an aerosol which contains the catalytically active material or the precursor thereof as a disperse phase is provided and the aerosol is passed through the reactor at a rate in the range from 0.1 to 4 m/s, which is established so that the disperse phase of the aerosol is deposited on the internals in the reactor and wherein the reactor is employed for carrying out oxidation or hydrogenation reactions and the oxidation or dehydrogenation reactions are synthesis of maleic anhydride, phthalic anhydride, or ethylene oxide.

APPENDIX B

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

APPENDIX C

No related proceedings are referenced in II. above, hence copies of decisions in related proceedings are not provided.